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METHOD AND SYSTEM FOR DYNAMICALLY PROVIDING MATERIALS AND TECHNOLOGY INFORMATION

BACKGROUND

This invention relates generally to a computer-based method and system, and more particularly, this invention relates to a computer-based method and system for dynamically providing materials and technology information to authorized system users. During the planning phase for a new product, development engineers seek out information pertaining to production materials and related technology that exist in the market and that will produce optimum economic and structural benefits for their product. In a typical organization, information regarding product materials and technology is often gathered by these development engineers in a haphazard fashion through the use of various supplier catalogs, telephone inquiries, and by word-of-mouth. As can be expected, some suppliers and some engineers may be less effective in gathering this information than others, often leading to poor decisions and other inefficiencies based on incomplete or out-of-date information. Procurement engineers, who are technical experts in a particular commodity, are generally available to help guide development engineers through these selection decisions. However, procurement engineers are often unable to help with all technology selection decisions due to limited resources.

A process is therefore required that can provide a means of gathering materials and technology information from a variety of sources and that allows continuous, 24-hour

access for authorized persons around the globe.

BRIEF SUMMARY

An exemplary embodiment of the invention relates to a computer-based method and system for gathering materials and technology information from internal as well as external sources, integrating the information into a format accessible to disparate systems, storing the information in a centralized system, updating the stored information as needed, and providing continuous access to the information for authorized users of the system. The development toolkit network (DTN) of the present invention is a set of applications designed to facilitate the gathering of technical information about supplier product offerings and new technology, and to disseminate that information to an organization's development engineers around the globe. In the quickly changing electronics industry, this can mean disseminating information very early, such as, while products are still in the development stage. The DTN tool is designed to assist development engineers in materials and technology selection, by providing a graphical, easy-to-navigate set of information in real-time.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring now to the drawings wherein like elements are numbered alike in the several FIGURES:

FIG. 1 is a block diagram of a portion of the system that includes a plurality of workstations and servers on which the DTN tool is implemented;

FIG. 2 is a diagram illustrating the flow of technology

information among development engineers, procurement engineers, and suppliers utilizing the DTN tool;

FIG. 3 is a flowchart describing how a development engineer utilizing the DTN tool acquires supplier and technology information;

FIG. 4 is a sample technology selector screen window provided by the DTN front-end database;

FIG. 5 is a sample technology roadmap screen window provided by the DTN engineering notebook database and illustrates backplane connector technology items;

FIG. 6 is a sample supplier technology comparison screen window provided via the DTN supplier survey database and illustrates a technology family in the backplane connector technology;

FIG. 7 is a sample technology survey response screen window for a chosen technology family in the backplane connector technology;

FIG. 8 is a flowchart describing how a supplier utilizing the DTN tool submits a technology survey; and

FIG. 9 is a flowchart describing how a procurement engineer provides new technology information to an organization via the DTN tool.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In an exemplary embodiment, the DTN application is implemented through a networked system such as that shown in FIG. 1. Although not necessary to realize the advantages of the present invention, system 100 may be part of a wide area network in which different geographical locations are interconnected, either by high-speed data lines or by radio

links, interconnecting hundreds of workstations at widely disparate locations. In the simplified diagram of FIG. 1, system 100 includes an organization 102 comprising a web server 104, an applications server 106, and a database server 108 that are located on a host system 110 and connected through a network 112 to workstations 114. The term "organization" refers to the system implementing the development toolkit network (DTN) applications. Network 112 may comprise a LAN, a WAN, or other network configuration known in the art. Further, network 112 may include wireless connections, radio-based communications, telephony-based communications, and other network-based communications. For purposes of illustration, however, network 112 is a LAN. A firewall 122 limits access to organization 102 to those network users possessing proper access permissions.

Host system 110 is running suitable web server software designed to accommodate various forms of communications, and which allows information in data storage devices 118 and 120 to be published on a web site. For purposes of illustration, host system 110 is running Lotus Domino (TM) as its server software. Applications server 106 executes the DTN tool, among other applications utilized by organization 102. Applications server 106 is also running a groupware application such as Lotus Notes (TM) which allows remote users to access information through its replication capabilities, provides e-mail services, and supports a secure extranet architecture.

Data storage devices 118 and 120 reside within intranet 112 and may each comprise any form of mass storage device configured to read and write database type data maintained

in a file store (e.g., a magnetic disk data storage device). Data storage devices 118 and 120 are logically addressable as consolidated data sources across a distributed environment such as a network system 100. The implementation of local and wide-area database management systems to achieve the functionality of data storage devices 118 and 120 will be readily understood by those skilled in the art. Information stored in data storage devices 118 and 120 is retrieved and manipulated via database server 108.

Data storage device 118 provides a repository for a variety of information and stores the front end and engineering notebook databases of the DTN tool. A second data storage device 120 houses the technology surveyss database of the DTN tool. All three features are further described herein.

System 150 comprises a web server 152 that connects workstations 154 to an intranet 156 and to the Internet. Firewall 158 provides security and protection against unauthorized access to internal network information from outside sources. Each of workstations 154 may access web server 152 via internal web browsers (not shown) located on workstations 154. A data storage device 160 is coupled to server 152. A replica 128 of the technology surveyss database from data storage device 120 is accessible to system 150 via extranet 140. System 150 is typically an existing or prospective supplier of organization 102.

The DTN tool is a set of e-business applications that provides an environment for storing the supplier knowledge that procurement engineers have, and allows constant access to development engineers around the world. Suppliers also

have 24-hour access to submit supplier surveys to educate the organization about new technology offerings and changes to existing technology. All suppliers have the same access to the tool, and this competitive situation provides an incentive for them to keep their information up-to-date.

Procurement engineers of organization 102 have access to the DTN tool both in their office and while traveling by using a replica of the Lotus Notes (TM) databases from data storage devices 118 and 120. Whenever new information is discovered, the engineer can edit the information via the DTN tool, usually stored in a web browser program, and replicate it at his/her earliest convenience using dial-up access to organization 102. Additionally, web server 104 may be programmed to systematically conduct scheduled replications, whereby database replicas are temporarily stored in a queue awaiting replication (not shown). Replications may be scheduled by organization 102 as frequently as desired in order to provide access to the most current, up-to-date information. Procurement engineering also uses the DTN tool to educate development engineers about the organization's strategic direction through the use of the technology roadmaps tool (described further in FIG. 5), and may provide markings designating "preferred" technologies and suppliers (further described in FIG. 6). The development engineer has access to DTN via the organization's corporate internet, or intranet 112, using a standard web browser (not shown).

The goal of the DTN tool is to provide access to the most complete, up-to-date information regarding product offerings for authorized users, facilitating a better

understanding of market and technology trends. The DTN tool achieves this through its three interlinked subcomponents: the DTN front end feature, the engineering notebook feature, and technology surveys feature.

The DTN tool includes three separate Lotus Notes (TM) databases that reside on data storage devices 118 and 120, and acts as a gateway into many other forms of information. The DTN front end and engineering notebook databases reside in data storage device 118, while the technology surveys database resides in data storage device 120. Both data storage devices 118 and 120 reside within the organization's intranet 112. Since they are within the intranet, they are accessible to all of the organization's employees who have proper access permissions. These databases can be replicated to portable devices, such as laptop computer 130 of FIG. 1, allowing access to information while traveling. The technology survey feature of the DTN tool provides two replicas of the same database. As stated earlier, the first replica of the technology survey database resides in data storage device 120 and is inside the organization's firewall 122, on intranet 112, for access to the organization's employees. The other replica 128 is accessible through the organization's extranet 140 to authorized suppliers. Many replicas may be necessary and will depend upon the number of authorized systems or suppliers requiring access to organization's 102 information. Administration of security and access is controlled through a gateway application capable of integrating disparate data and applications in a secure fashion, such as IBM's Electronic Supply Chain (ESI) Interlock tool, which is described in U.S. Patent

Application Ser. No. 09/658,257, filed on September 8, 2000, and is incorporated herein by reference in its entirety.

A framework for the flow of information associated with the DTN tool is described from the point of view of three types of system users: development engineering personnel (also referred to as 'user'); procurement engineering personnel, the technical experts who provide analysis and comments on materials and technology; and supplier representatives, who provide the technical raw data. This flow of information is systematically integrated and organized via the DTN tool as shown generally in FIG. 2.

The flow of information from the development engineering point of view is described in FIG. 3. A development engineer ('user') accesses the DTN tool because of a need for supplier and/or technology information at step 302. For example, a new system under development may require backplane connector technology. The user accesses the organization's intranet web page at step 304, selects the DTN tool icon which, in turn, causes the DTN tool to query the front end database resulting in the technology selector window 400 of FIG. 4 to be displayed at step 306. The user then selects the connectors option 402 from the technology selector window 400 at step 308. The technology selector window is designed from a user's point of view, to make the selection process visual and simple. The user then clicks on 'Backplane' 404 and flow proceeds to step 310 where the user is transferred over to the DTN engineering notebook's technology roadmap database located in data storage device 118. FIG. 5 illustrates a typical technology roadmap window 500, a component of the part and supplier

selection process. The technology roadmap feature of the DTN tool both provides users with important summary information about a specific technology as well as information concerning "preferred" technologies for future consideration in order to encourage common technology selection among the different users of organization 102.

Using the technology roadmap of the DTN tool, a development engineer compares the listed technologies in terms of performance (density and speed); relative age in the industry (mature versus new); and recommendation of procurement engineering (preferred families) as shown generally in FIG. 5. This information is gathered from a variety of sources and is described further herein. Using this information, a user will click on their chosen technology family 502 from the technology roadmap window 500 at step 312. The technology survey comparison window 600 of FIG. 6 appears at step 314. The user has now left the DTN engineering notebook database in data storage device 118 and has entered the DTN technology survey database in data storage device 120, although the transition was transparent to the user. The technology survey comparison window 600 of FIG. 6 shows back-to-back comparisons of the chosen technology as available from each supplier that has filled out a technology survey entry. The information presented on technology survey comparison window 600 includes important performance parameters 602 for the particular technology, in compact form allowing for comparisons of the supplier capabilities to be made. Also shown in FIG. 6 is input from procurement engineering personnel in the form of check-marks 604 which appear next to designated, or preferred,

suppliers. This allows users to determine the opinions of the procurement experts who work with these suppliers and rate their prices and performance criteria. Check marks 604 can be displayed in a different color to further distinguish preferred suppliers and/or preferred technology families.

A user desiring to learn more information about a particular item or component for a given supplier can click on the appropriate line entry from window 600. For example, a user desiring additional information selects line 606 at step 316. The technology survey response window 700 of FIG. 7 is then displayed at step 318 which details the complete supplier technology survey response for the selected line 606. The survey contains responses to a set of technical questions that are common and easily comparable between suppliers and is further described in FIG. 8 below. The question set will necessarily vary from technology to technology. Some of the items on the technology survey response window 700 provide URLs 702 linking a user to supplier web sites and further sources of information. The user can click on the desired link 702 at step 320. The information provided by linking to the supplier's URL may be in the form of datasheets or qualification data (step 322). At any time, the user may use the "Back" button on the browser window to view different suppliers, families, or technologies (not shown).

FIG. 8 describes the information flow from the point of view of a supplier utilizing the DTN tool. As described above, suppliers provide information relating to product offerings via supplier technology surveys. Suppliers access the supplier technology survey through the organization's

extranet 140 of FIG. 1. The organization's extranet enables secure supplier interaction via the Electronic supply-chain Interlock (ESI) application described above which is used in conjunction with the DTN tool and provides access capabilities such that a supplier need only have one password and deal with one administrative center.

Access to the technology surveys database is initiated when a supplier representative has new information that he would like to share with the organization (step 800), or when someone within the organization requests the information. Suppliers at system 150 may be requested by organization 102 to complete one survey entry for each technology family that they offer. Suppliers are furthermore asked to complete survey entries for technologies that are still in development and/or conception.

FIG. 8 describes how a supplier submits information to organization 102 via the technology surveys database 128. First, the supplier enters the URL for organization 102 via workstation 154 at step 802. This URL was given to the supplier representative during registration through ESI. After entering a user name and password, the supplier is allowed to access the organization's extranet 140. A replica database 128 of the technology surveys database stored in data storage device 120 is now available to the supplier at enterprise system 150. Replica database 128 may be structured to provide limited access and editing abilities to enterprise system 150. Once database 128 is accessed, the supplier is then presented with a 'view' of all previously completed survey entries by anyone from

system 150 at step 804. At this point the supplier is given the option to either view an existing entry or submit a new one at step 806.

To create a new entry, the supplier clicks on the "Create New" button at step 808, and a supplier letter is displayed (not shown) at step 810. The letter contains basic help information and a list of available surveys at the bottom of the page. When the supplier user clicks on the desired survey at step 812, a survey form appears with information to be filled in at step 814. The type of information requested will necessarily vary depending upon the respective technology family chosen by the supplier. A supplier has the option of attaching files to the survey form, if there is further technical information that is only contained in local files (not shown). At step 816 the supplier completes the survey form.

A supplier choosing to view or edit an existing survey entry clicks on the title of the survey in the view of all survey entries at step 818. This will present the survey in read-only mode initially, similar to the technology survey window 700 of FIG. 7 at step 820. The supplier may then either click the "Back" button on his browser to return to the list, or click the "Edit" button at step 822 to make changes or additions to the survey. This represents the existing information in a form for editing.

Each time a survey form is being edited, whether existing or new, the DTN tool sets the survey editing function to "Draft" mode at step 824. Draft mode allows a supplier to save work prior to completion, if further information needs to be gathered prior to finishing the

survey at step 826. When the supplier selects "Final", the survey is saved at step 828, and automatic notification occurs. A lookup table is available in the technology surveys database which links particular technology families with individual procurement engineers of organization 102 (not shown). Notification of a "final" saved survey is automatically sent to the appropriate procurement engineer by email for review and rating at step 830.

After saving the survey, the supplier is re-directed back to the view showing the complete list of survey entries at step 832. Whether the survey was marked draft or final, the survey response is made available to the organization's users as soon as scheduled firewall replication occurs. Suppliers have access 24 hours a day to add, update, and change their information. Since the organization's procurement engineers use the DTN tool exclusively to mark and distribute the list of preferred technologies and suppliers, suppliers are more willing to submit information through the tool. Since the information is available to all of the organization's development engineers, the supplier users also recognize the DTN tool as an efficient use of their time as a marketing tool.

FIG. 9 illustrates the flow of information from the point of view of a procurement engineer. The two main functions for procurement engineers are to (1) review the entries provided by suppliers, and provide feedback and preferredness ratings, and (2) input new technical-intelligence information into the DTN engineering notebook.

A procurement engineer reviews new supplier entries as described herein. When a supplier marks a technology survey

as "Final" and selects "Save" as described in FIG. 8, an email/notification is automatically sent to the engineer responsible for that technology family alerting him/her of the new information at 900. In the supplier comparison view of FIG. 6 that the development engineer sees, this new survey is marked "New Entry" (not shown) and is separated from the rest of the information. This informs the user that the data provided by the supplier has not yet been validated, nor has the supplier's preferredness status been marked.

The procurement engineer accesses the technology survey database in data storage device 120 through Lotus Notes (TM) at step 902 and views all of the technology survey responses at step 904. The procurement engineer then clicks on the new entry title at 906, and the selected technology survey response is displayed at step 908. The engineer reviews and edits the information at 910. There are several types of information for the procurement engineer to complete, such as feedback to the supplier, (e.g., giving opinions of the product); assessments (e.g., an engineering assessment for an organization's development engineer); preferred supplier, (e.g., whether the supplier is preferred for the family); and preferred technology family (e.g., whether the technology is preferred to other similar types). When the supplier or technology family is marked "preferred", the survey entry in the view is automatically re-categorized to alert a development engineering user of the information at step 912.

A procurement engineer may also learn of new technology from sources other than supplier surveys (step 914). In

this instance, the engineer can choose to either record the new information either directly via the engineering notebook database of the DTN tool or through local files replicated to a remote device at step 916. If the engineer is situated at workstation 114 within organization's 102 intranet 112, the direct method is typically used at step 918 whereby the new information is edited directly via the DTN tool and updates are immediately reflected in the system. If the engineer chooses to provide updates via a remote device at step 920, the changes would not be replicated to the appropriate database of organization 102. The engineer would still be required to open the engineering notebook database of the DTN tool as indicated in step 918, select the design access option at step 922, and load the appropriate updated files into the engineering notebook at step 924. The engineering notebook contains the technical intelligence for the organization's future direction in a particular technology. The structure of the engineering notebook is customizable, and typically contains the following Lotus Notes (TM) design elements: navigators, where links may be placed over a chart or picture; and free-form pages that may be updated with text, pictures, and OLE-enabled documents.

The DTN tool provides continuous access to the most complete information on product offerings and technology, enabling an organization to better understand market and technology trends, and deliver consistent information to all necessary parties. The DTN tool's subcomponents; namely, the DTN front end, engineering notebook, and technology surveys features facilitate this information delivery by

integrating dynamic product and technology data received from a variety of sources into a single, centralized system.

While preferred embodiments have been shown and described, various modifications and substitutions may be made thereto without departing from the spirit and scope of the invention. Accordingly, it is to be understood that the present invention has been described by way of illustration and not limitation.